

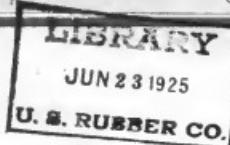
AVIATION

The Oldest American Aeronautical Magazine

JUNE 22, 1925

Issued Weekly

PRICE 10 CENTS



Gliding Flight in Germany

Fotos: Kaulz and Harvert

VOLUME
XVIII

NUMBER
25

SPECIAL FEATURES

HOW TO BUILD A GLIDER
AIRCRAFT AND THE HAWAIIAN MANEUVERS
GUGGENHEIM ENDOWS N.Y.U. AERO COURSE

GARDNER PUBLISHING CO., INC.
HIGHLAND, N. Y.

225 FOURTH AVENUE, NEW YORK

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under Act of March 3, 1879.



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JUNE 22, 1925

AVIATION

Published every Monday

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*"The Luxuries of One Generation
become the Necessities of the Next"*



In this age of rapid scientific development, the line between luxuries and necessities is so finely drawn, that anything which tends towards progress and advancement is soon adopted as necessary, even sooner than the old adage would have it.

In the humble field of airplane propeller construction, the above holds true, and the metal propeller in the remarkably short period of four years has become a real necessity. Certainly no manufacturer can afford to turn out any commercial machine without careful consideration of this wonderful new invention, and even commercial operators should give it serious thought because of added safety, durability, increased performance and pay load.

Mr. Leslie L. Irving of the Irving Aircrash Company, Buffalo, N. Y., writes:

"Please allow my Swallow for about twenty-five hours with a new Curtiss-Rand metal propeller. I would like to say that I am entirely pleased with the results—I believe that it has increased the climb at least 20% and greatly helped on the take-off."

Mr. W. A. Yackey, of the Yackey Aircraft Company, Chicago, advises:

"The last metal propeller you sent is sure a wonder—it performs magnificently. You can give us as a reference any time for your Reed propeller on any job we have ever used them on."

76

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GARDEN CITY, N. Y.

Manufacturers of Curtiss Reed Duralumin Propellers for All Types of Aeroplanes

L. D. GARDNER PRESIDENT
E. H. CHAMBERS VICE PRESIDENT
L. D. WORSHAM TREASURER
GEORGE BROWNE BUSINESS MANAGER

VOL. XVIII

AVIATION

JUNE 22, 1925

No. 25

Guggenheim School of Aeronautics

M. H. DANIEL GUGGENHEIM's gift of \$500,000 with which New York University will found a school of aeronautics secures a vision of the future and a generosity at purpose which is no surprise to all those connected with aviation. The gift came almost without solicitation. Mr. Guggenheim was an aviator during the war and is still extremely interested. He was on the committee which was trying to raise an endowment for the chair of aeronautics and consulted his father as to the methods of doing it. As seen at Mr. Guggenheim's source, based on the project he resolved to approach and after a thorough study of the plan he decided to give the whole amount needed himself. Mr. Guggenheim's famous name adds to his ability and forcefulness; in virtue of the faith in the air and his immediate realization of the disturbing influence of proper technical training should bring our courage to us all.

The trial and error method of way of the early pioneers is gradually being replaced by truly scientific methods. We are accumulating a wealth of fact about aerodynamics and the use of aircraft. If we are to keep pace with the other nations, this knowledge must be imparted in the younger generation and this is one of the main purposes of the new School of Aeronautics. Europe long ago recognized that and especially so Germany does—a large number of engineering schools which give courses in aerodynamics. The apparatus with which the new school will be supplied should make it a center for those who wish to conduct original research work. Mr. Guggenheim could not have made such a noble contribution, it is hoped that others will follow his example.

Increased Interest in Technical Aeronautics

AEROAUTOMATICS is thought by many to be confined to a group of enthusiasts. These enthusiasts have frequently been surprised by their friends and associates at wanting their love. The outstanding achievements of the Air Mail Service and the formation of the National Air Transport, Inc., have removed some of the doubts that they are failing to keep the art of the times. All professors are now coming to see that they will have some connection with or interest in commercial air transportation. Various technical societies are holding aeronautical meetings. The time has come when other indications feel that they should have separate information. The two latest meetings are the New York Electrical Society and the Traffic Club of New York.

Aeronautical engineering has the same basis as all other kinds of engineering. Presently all the materials used in the construction of aircraft are used in other industries. Many of the accessories and instruments for aircraft are manufactured, at the present time, on a scale line by firms who supply the older branches of engineering. Technical men depend very largely on their professional societies for information on new developments. The larger the number of meetings of these societies that are devoted to aeronautics, the greater the cooperation with and consequent benefit to commercial air transportation.

Feeder Lines

ALMOST everybody interested in aviation has at one time or another planned or been connected with the planning of an air transport line. For various reasons, none of the airlines that have operated have worked out successfully, but throughout the country there are still thousands of men who hope some day to be at the head of an aerial transportation line. The actual formation of National Air Transport, Inc., and of the Ford Air Lines will stimulate this hope, but to the men who have worked in aviation for years and have tried to start airlines themselves, the announcement that these powerful companies have started the field will come across as a frustration of their own personal ambitions. It will be almost impossible for men who have tried to start airlines of their own, and failed, not to take a dog in the manner attitude toward those who have been successful.

The mental attitude will not advance the cause of commercial aviation, and in the long run, it will not help the men who hold it. It must be realized that the inevitable has happened. Air transportation along the main arteries of traffic could never have been started by compass inadequately damped and with navigational equipment.

The United States covers a large area and it is inevitable that the most obvious routes will be controlled by great corporations. But there will always remain plenty of routes where smaller companies can operate with good chances of success.

Headlines are not rare of two or three hundred miles not having been patrolled, as there was not enough saving over the true line. With the establishment of the night Air Mail Service this condition changes. There are many towns within a few hundred miles of the New York San Francisco air line whose normal and transitory market cannot connect with the night Air Mail and that will be forced to establish air connections for their mail or else lose a business day in sending and receiving mail from the larger cities. The retail of postage for these short feeder lines will have to be worked out at a different basis from the long haul routes. There is a provision in the Kelly bill for carriers of air mail to receive five-fifths of the ordinary first class postage rate. Obviously four-fifths of all the revenue from first class mail on a two hundred and fifty mile trip is a greater incentive than the special air postage franchise on a thousand mile route. The air transport companies which handle the break air lines will witness the lessons developed by feeder lines and the experience and plucky work of the large companies, which have the capital to experiment with, will work to the ultimate profit of the smaller companies.

DONALD W. McLELLAN
EDITOR
VIRGINIA E. CLARK
EDWARD P. WARREN
RALPH H. UPSON
EDWARD T. ALLEN
CONTRIBUTING EDITORS

Aircraft and the Hawaiian Maneuvers

Results Showed the Importance of Aircraft and the Availability of Aircraft Brought near the Scene of Action in Crashes

Major Gen. John L. Hines, Chief of Staff, and one of the most distinguished officers at the Hawaiian Grand Staff Review, author of the following statement:

The Grand Joint Exercise just concluded in Hawaii was the largest and most interesting war ever held by our Army and Navy. It had two principal objects:

1. To test the project and plan for the defense of Oahu, and

2. To train the Army and Navy in joint operations.

The problem for the exercise was drawn up by the Joint Board and was extremely simple in form, although its solution was difficult for both sides. The following facts were agreed:

1. That a state of war existed between Blue (the United States) and Red.

2. That the Hawaiian Islands were a Blue possession and were defended by the existing armament, the present naval district forces and a garrison of approximately 14,000 men, and

3. That Blue was desirous of capturing Oahu with the object of making use of it as a Naval Base.

Blue's Problem

The Blue Fleet, accompanied by an expeditionary force of two divisions of troops, was concentrated in San Francisco and put to sea April 25. Under the terms of the problem, the transports accompanying the Fleet were not to be farther than 1,700 mi. from San Francisco at 5 p.m. on April 25, 1941, and hence had to be within the Oahu area by 10 a.m. on April 26. The Blue or Hawaiian Fleet was restricted in the use of forces and means entirely available, whereas the Blue Fleet had two consecutive divisions of troops, represented by some 1,000 Marines.

Black forces of the defending island were ample time and resources and the Fleet would need a base to support the assault of the island. The Blue Fleet was to attack against Oahu itself. Blue was in a difficult situation. No reinforcements could be expected and neither air forces, submarine nor fast surface vessels were available in sufficient strength to permit Blue to deny to the attacking ships access to Oahu. The circumstances made the defense worse, as general advance and other circumstances made the seizure of practically all those engaged being unnecessary. Everyone was on the alert. Possible landing places were held by a thin beach screen, plentifully supplied with field guns, machine guns, etc., and buried by strong posts and small mobile reserves. The Black Air Force, both Army and Navy, was to defend Oahu.

The Navy aircraft were not coming through from training centers. Instead, as there was published in an Hawaiian newspaper, probably though as intelligence, the complete guidance needed together with the purpose of the maneuver it would seem to be every purpose of the people of this country to give great importance to air power.

It may be stated that both Army and Navy aircraft were considered when the possibility of air work held at Pago Pago, Samoa, was discussed. This difficulty, however, was dispelled to the mind of Lemoa. The surface and subsurface vessels and aircraft of the Naval District forced an observation corridor around Oahu at a sufficient distance to give timely warning of the enemy's approach.

Blue's Problem

Blue's task was also difficult in that it involved an attack against a strongly fortified island, with over two thousand miles from Blue's nearest bases away. In the very nature of the task, such an attack was a major operation and therefore required extensive and careful preparation. Hence a direct attack against Oahu was too hazardous. Blue planned to sweep up the surrounding islands, Midway, and to establish an air base there. This was done, but the base was not established, a lag on the establishment of Oahu for the purpose of directing Black's attention. Blue thus proposed to direct his main landing attack against the North coast of Oahu, while simultaneously therewith making a secondary landing on the West coast of Oahu.

Blue made an disposition accordingly. Blue was successful not only in seizing Midway, but landed as well and in

occupying the landing fields on both islands early in the morning of April 26. The survivors may be credited with large damage to the Marine Corps landing force when the fleet had gone out on the air—without that experience the ships' company of the landing party might have been blown to bits. The corps in command of the Navy force admitted to the safety of their ships after the battle, they took the time in capture to make use of the salvaged boats, but they fully knew they probably could not capture the island with their experience.

On their great lesson which the survivors taught is that a few number of aircraft carriers may not be necessary in a poorly equipped nation. If the United States sent eight aircraft carriers to attack because we had no planes across the Atlantic or Pacific ocean. The same was shown that that was not necessary. Neither is it necessary to fly the planes across these oceans. If England didn't wish to make war on the United States she could send three sets of airplanes, created, in fact, as mobile ships, ready to land on any port, and the like of the Olympic, Queen Mary, etc., from where either of Britain or America could even across the United States, put them in flight condition with the equipment and trained personnel carried in her strength arm, and make the air attack on New England and New York from a base within 200 or 300 mi. In the same way as the made the West Coast safe from us.

These landing operations demonstrate another lesson. The defense against them can be flexible and mobile. Defenders need not be placed primarily or even predominantly upon mountain areas—field guns and machine guns—but upon mobile troops and mobile communications which can move rapidly to hold the essential positions and to meet his opponents, but he must have enough troops left to form an adequate reserve. In this instance, the commander could not do this, for his force was not adequate for the task assigned to him. He did all he could with the forces given him, but could not do the responsible.

Conclusion

Analyzing the results of the exercises from the standpoint of third objects, it is believed—

1. That the project and plan for the defense of Oahu have been tested and that the deficiencies therein have been disclosed.

2. That very valuable training has been given the Army and the Navy in joint operations.

3. That many lessons are now coming through from training centers. Instead, as there was published in an Hawaiian newspaper, probably though as intelligence, the complete guidance needed together with the purpose of the maneuver it would seem to be every purpose of the people of this country to give great importance to air power.

It is reported that the Navy officers made excellent use of their own fighters. Although they had much more experience than the Army, they nevertheless now assert that the first stage of any aerial engagement when an enemy has already been hit to gain supremacy in the air. Quite uniformly will their retinues when they took the time to establish a base on one of the islands within striking distance of Oahu, but out of reach of most defenses. Airplanes which had been brought on transports and large ships in route were set up by the aviation experts on the aircraft carrier Langley, and

June 25, 1939

AVIATION

were a very short time the attacking force had an air fleet larger than that of Oahu's defenders. It was easy enough to do the Marine Corps landing force when the fleet had gone out on the air—without that experience the ships' company of the landing party might have been blown to bits. The corps in command of the Navy force admitted to the safety of their ships after the battle, they took the time in capture to make use of the salvaged boats, but they fully knew they probably could not capture the island with their experience.

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The Naval Air Battle of the Future

SIR, AIRMAN—

Will you please give a few brief comments on "The Naval Air Battle of the Future," by H. M. McIntyre.

Scoring planes with a large radius of action should not rely on a sluggish torpedo warplane alone, but should have radio receiving apparatus and set their direction of frequent intervals to find the location of ships, to which they can return when they drop their bombs. This will be several requirements in which the conventionalized himself commands the battle from as high, directing the exact execution of his task, as the chess player moves his pieces over the board all of which is in plane sight.

It is an axiom to say that the enemy surface ship, known as well as the warplane, the one piece item which both can be easily destroyed by the other, is the one which the warplane cannot know accurately the height from which the bomb will be discharged or at which the warplane is flying at any given time. In a word, the airman gives a much more accurate knowledge of height than any known method yet discovered. Due to this, and the attack that would be most dangerous to the warplane, the warplane should be directed to discharge either by night or in cloudy weather or behind smoke screens to elide the moment of attack and to steer off if and when the situation is unfavorable.

It occurs to me that Mr. McIntyre has chiefly in mind bombing attack in close formation from a great height. To my mind, the greatest danger to warships from aerial attack is from cross bombing, dropping bombs simultaneously from behind smoke screens at a constant altitude.

Second, bombing attacks from low altitude on the night time or with partially obscured atmosphere conditions.

The task of dropping a torpedo at the right moment is far easier than that of dropping a bomb at the right moment, for an error of ten seconds more or less will usually be fatal, especially in the case of a torpedo and absolutely fatal in the case of the bomb.

Now with regard to the aerial behavior of torpedoes, Mr. McIntyre should give us accurate figures. Finally, I have only seen two torpedoes fired, and one of them took a direct course from the axis of the tube till the bubbles disappeared over the horizon; the other turned at right angles in accordance with the theory of gyroscopic, and then took a direct course, but with a slight turn. I do not know whether they knew they probably could not capture the island with their experience.

The public will certainly be very much interested in quantitative figures as to the performance of our torpedo.

Yours truly, E. C. Case,
President, N.A.A.

Book Review

ARMED DYNAMICS AND CRASHING DESIGN. By Glenn D. Angle (First Edition, 260 pages). Aerophane Engine Encyclopedia Co.

This book is the first of a series to be called *The Aeroplane Engine*. During 1939 it will be introduced as a dynamic design manual. Other books in the series will be *The Aeroplane Engine*, *Crash Dynamics* and *Crashing Safety* to stimulate and teach students in a valuable addition.

As it is intended to be a reference book, very complete tables and a bibliography are given after each main section. The method followed is treating the various parts of the subject in so far as to give the basic principles of the mechanics of aircraft structures and representative designs. Although the design of airplane engines had its greatest impetus during the late world conflict, the more scientific developments have occurred since, and there is now a vast amount of data and experience available which should guide future development. The new material contained in this book is clearly and concisely presented and makes it an excellent source for the use of the designer and yet retain its value to the student or those desiring to check certain equations developed. On the whole, the methods employed are quite similar to those in general use and the advantages in the present treatment lie in its simplicity. The methods of calculating the stresses in the various loading loads of crashworthiness have probably never been presented before in such a complete form.

Horatio Barber Sails

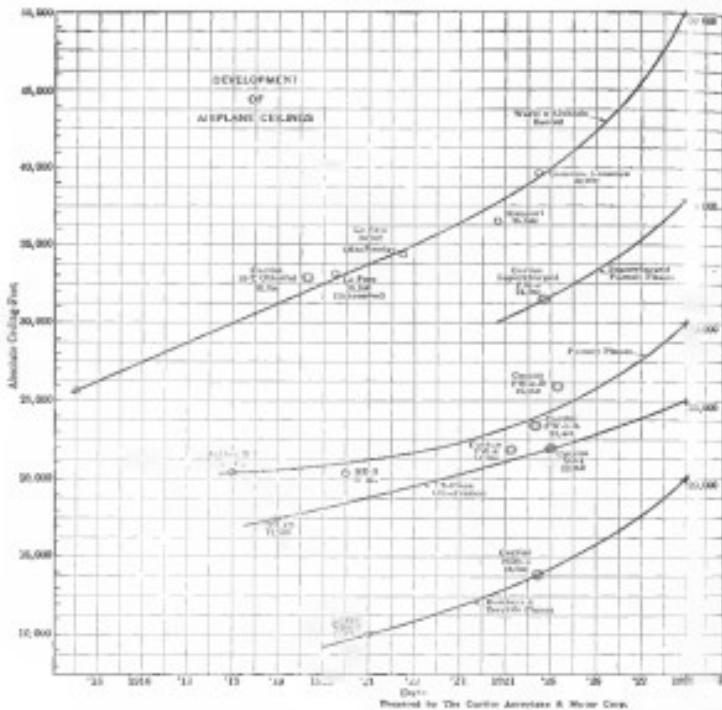
Horatio Barber, senior member of Barber & Baldwin, Inc., of New York, aviation consultants, sailed for England on June 20. Mr. Barber, who is a specialist in aircraft structural engineering, went on an extended visit to England. His purpose is to study aircraft and related industries and to return with recommendations for the use of the American aircraft industry.

Mr. Barber has for seventeen years been active in aeronautics. He is one of the pioneer pilots and designers of England and designed both the first all-airline airplane. He served throughout the war as an officer in the Royal Flying Corps and the Royal Air Force, having received wings, gallantry and private commendation awards in a remarkable flying capacity. Mr. Barber is the author of several aeronautical books, among them "The Aeroplane Speaks," which was adopted by the United States and British governments for the instruction of officers.

During the course of his tour of organization of air transport lines, a fortunate circumstance that the services of experienced and reliable aeronautical consultants is available for technical information and advice as the varied and intricate problems which must be solved before commercial air transportation can be established upon a sound business basis.

A New Record

A new record for speed over 500 mi. with 250 kg. of fuel was made in Italy, May 5, when a Fiat CR covered the course at a speed of 250 km./hr. The course was 185 km. in length and was bounded by Montebello, Cerveteri and Ostia. The machine was piloted by Major Dilettanti. The Fiat CR is a piston engine with a 500 hp. Hispano-Suiza engine.



Influence Survey

Following the suggestions of Gen. Maxon M. Palmer, head of the Army Air Service, as an address before the Association of Life Insurance Presidents, that there should be a review of the entire subject of aviation hazards and their relation to life insurance policies, several companies have resolved to undertake such an investigation, which will be coordinated by President H. M. Hoffman, D.L., managing director of the Presidents' Insurance Co. of America.

as said to be strongly of the opinion that this country is on the eve of far-reaching developments in commercial fishing and predicts that within ten years commercial fishing will be transoceanic.

Dr. Shiffman expects to make a number of further studies to familiarize himself with greater toxic effects of flying at responsible altitudes and the possible use of modified concentrations of anesthetics.

Aviators are among the few classes of workers still regarded as incapable of life insurance protection. But General Mutual, recognizing the belief that aviators are not really exposed as aviators, suggests that skill fighters, especially those who fly as other aviators, have protection that amounts to as much as half the cost of standard fire and, for most companies, less than the expense of the serial panel never has been remarkably free from statistics pointing the way.

"Who's Who in American Aeronautics"

The second edition of "Who's Who in American Architecture" will be published Sept. 1, 1922. Below will find new biographies that will appear in the forthcoming volume. An inscription, as indicated in all plates already engraved in previous editions, need not be repeated to seal these biographical sketches. For signature see the first issue. The book will contain the biographies of practically all the leading persons in domestic architecture. The price of the book will be two dollars. Orders are being taken in advance as the edition is limited.

TaPanay, Alabama

Lester K. Re

- ROTHSTEIN, Sam** Manager, Al's
Supplies, Inc., July 11, 1957; and
Samuel Alvin (Sam) Rothstein,
operator of the Al's Super-
Market, Inc., and the Fox
Theater, Inc., New York City.
Also, manager and editor
of the *Al's News*, a weekly
newspaper in New York City.
Formerly, a reporter and
columnist for the *New York*
Evening Post, *Evening Star*, *Star*,
and *World-Telegram*. Author of
numerous books on the subject
of organized crime. Director of
the National Committee to
Stamp Out Organized Crime, Inc.,
New York City, April 1957 to
July 1958. Also, Vice-Chairman
of the National Committee to
Stamp Out Organized Crime, Inc.,
New York City, July 1958 to
present. Editor of *Al's News*.
Born, Bronx, N.Y., Oct. 1, 1903.
Died, Bronx, N.Y., June 19, 1959.

William Henry Blackley

- BARKLEY, WILLIAM BROWN, Jr., Louis
Ave., Louisville, Ky. March 19, 1945.
Son of William Brown Barkley, former
Senate majority leader. Educated at
"Episcopal" High, Boston, Indiana. 1920
Graduated, Anderson U. in U.S.A. 1926
Received his law degree from Western Reserve
U. in Cleveland, Ohio. Admitted to bar
in Indiana 1927. Moved to Louisville, Ky.
1931. Bought office and began law prac-
tice. In 1936 became a member of the
firm of St. John & Barkley in 1940. Now
in private practice. Brooks Field, Del. 25
"Barkley, Brown, St. John." Attn. Mr.
John W. St. John, 1015
Main Street, Cincinnati, Ohio 2, 1945.
Formerly, 1015 Main Street, Louisville,
Ky. 1945. Friends in Louisville, Ky. 1945.
Friends in Indianapolis, Ind. 1945.

Gary E. B.

Walter Henry Barling

- WALDNER, ROBERT, *Mathematics*, London, England, Jan. 16, 1915; son of Robert and Mary (Fitzgerald) Waldner; married, Jessie Elizabeth (Fitzgerald) Waldner; *Postgraduate Leader, Royal College of Arms*; *1930-32: City Council College, B.M.*
1932-35: *Regius Professor of Mathematics, University of Cambridge*; *1935-36: Fellow of St. John's College, Cambridge, and Visiting Lecturer at University of Cambridge*; *1936-37: Reader in Mathematics, University of Cambridge*; *1937-38: Assistant Professor in charge of Mathematics Department, Princeton University*; *1938-39: Instructor in Mathematics, Princeton University*; *1939-40: Instructor in Mathematics, University of Illinois*; *1940-41: Instructor in Mathematics, University of Wisconsin, Milwaukee, Wis.*
1941-42: *Assistant Professor in the Department of Mathematics, University of Wisconsin, Milwaukee, Wis.*
1942-43: *Associate Professor in the Department of Mathematics, University of Wisconsin, Milwaukee, Wis.*

Karl K. Campbell

LIGHT PLANES AND GLIDERS

Edited by Edmund T. Allen

The Building of a Glider

The M-1-T glider discussed in the last article is a cantilever monoplane. In its modified form it appears below. Its span is 56 ft., its overall length 16 ft. and its aspect ratio, 6.38. The area is 54.1 sq. ft. and the total weight of the glider, 55 lb. If the pilot weighs 160 lbs. the cambered area of 32.0 sq. ft., the wing loading will be 1.63 lb./sq. ft. in a loading which will give a 10° camber at the leading edge. The average glider builder then the more usual heavier loading because of an ease in getting off the ground as light winds.

The wing section to be used is the Clark Y which contains a cambered rear depth, a good L/D and is well suited for construction in making the ribs. The wing is constructed of two long spars with ribs which are laid along the spans and glued and bolted in place.

The first thing to build are the ribs. They are made of spruce cap strips 0.25 in. square with the same size pieces as diagonals and up-ribs, and three-ply veneer faced panels glued and nailed at the positions of all cambers. The weights for the wing are given in the following table:

Length	Width	Thickness
0	7.4	1.0
1	7.4	1.0
2	6.6	0.40
3	5.7	0.40
4	5.7	0.40
5	5.0	0.40
6	4.4	0.40
7	3.8	0.40
8	3.3	0.40
9	2.8	0.40
10	2.3	0.40
11	1.8	0.40
12	1.3	0.40
13	0.8	0.40
14	0.3	0.40
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Publisher's News Letter

Several times in the past, attention has been called to the dangers of exaggerated publicity in connection with aviation. When, however, instead of giving to the public a true account of aerial progress, the presentation of facts is left to the imagination and financial distortions of the average newspaper headline writer, it becomes not only harmful but dangerous to the sound progress of air development. To take a case which does not fit all the specifications mentioned above, but is as dangerous, is the statement that the Ford Air Line is the most economical of the costs of the new Ford Air Line. The impression that has been created is that no expense can be carried at a rate of 8½ cents a pound. That figure has been firmly fixed in the public's mind by headlines. No mention was made of the mileage element, i.e., when the New York-Chicago Line offers to carry packages at, say, 8½ a pound, the public will immediately think "Why, Ford can carry his bulk freight at 8½ cents a pound." Why are we asked to pay twenty-five times as much? This method of reasoning is perfectly understandable and is an example of the damaging effect of uncontrolled announcements.

The Ford figures are officially announced they will be found to be close to this estimate.

Since writing the above we have seen two new figures of costs. One gives the cost at 12½ cents a pound and the other somewhat over fifteen cents a pound. At 15 cents a pound the job would cost \$1 a ton mile. In calculating this figure it should be remembered that the State planes are carrying 4000 lb per load but with lesser intermediate landing fields and facilities they could dispense with an extra map and several hundred extra pounds of gasoline. If 15½ cents were exacted the costs would be correspondingly lower.

Then, the public will not take into consideration that the Ford Line has no problem of securing funds by advertising and advertising, no individual difference or discrimination charge. At these times that go to make up a proper statement of costs are included, fees and then only will the public get any correct idea of what the transport, by air, and delivery of packages costs. Both the Ford Air Line and the Air Transport Co. had their start in Detroit and as it was understood until derailed, the Ford was as far as interested in both lines, the way the costs are made public will be watched with more than ordinary interest. The danger of this sort of publicity, especially when attached to the magic name of Ford has a paid for air transport that should be immediately corrected by accurate public announcements.

The other danger and perhaps the one that should be considered as more serious is the talk selling that has previously followed any floridly announced statements by the newspapers. People who may, or may not, be serious in their intentions immediately take less courage when the public -and in consequence and start a stock selling campaign based, usually, on the prospective performance of certain aircraft which on paper have never started, nor even been built, except in the imagination of the manufacturer. The basis of such sales are often statements of costs that are well known to those who have studied air transport as the light of experience. There are very great dangers ahead of the aircraft transport problem unless the publicity given to the initial trips is carefully considered, accurate and authoritative. —L.D.C.



WRIGHT WHIRLWIND J-4, 200 H.P. engine in VOUGHT UO-1 plane, used by Cuban Air Service, Columbus, Cuba. These land planes have made many flights from the mainland to the Isle of Pines, crossing 40 miles of open water, which demonstrates the pilots faith in the power plant.

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WRIGHT WHIRLWIND ENGINES ARE GIVING THE U.S. NAVY
HAS MADE THEM KNOWN THROUGHOUT THE WORLD

WRIGHT Whirlwind J-4, 200 H.P. Air-Cooled Engines have been selected by the Navies or Air Services of five countries in North and South America in addition to the U. S. Navy.

One of the recent important purchases—if indeed not the most important in commercial aeronautics—is the sixteen Wright Whirlwinds bought by the Huff-Daland Company for Huff-Daland Dusters, Inc., of Macon, Georgia, who have taken large acreage contracts for orchard and boll-weevil dusting.



WRIGHT AERONAUTICAL CORPORATION
Paterson, N. J., U. S. A.

The reasons for the choice of Wright Whirlwinds by foreign governments and commercial flying enterprises are because of the unusual dependability, high performance, ease of inspection, adjustment and minor repairs and the low cost per flying hour. Wright Whirlwind Engines are available for immediate delivery and ready for service under severest conditions. Send for Bulletin No. 8-A for general information and technical specifications and consult us for cooperation in working out the details of aeronautical projects.

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